

Homogenization of titanomagnetites with magnetite-ulvospinel exsolution structures according to the thermomagnetic data: Modeling and experiment

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Abstract

© 2016, Pleiades Publishing, Ltd. A three-dimensional model describing the homogenization of titanomagnetites with magnetite-ulvospinel exsolution structures in the course of thermomagnetic analysis is presented. The implications of the size and shape of the exsolution structures and the initial titanomagnetite composition for the temperature dependence of saturation magnetization during repeated heating is analyzed. It is found that the dimension of the exsolution structures has the strongest effect, whereas the shape and composition only have an effect in the case of the small exsolution structures. A method is suggested for estimating the dimensions of the exsolution structures from the thermomagnetic curve. A close consistency of the results is revealed by comparing the distributions of the dimensions of the exsolution structures estimated by the electron microscopy and by the analysis of the thermomagnetic curve for the same sample.

<http://dx.doi.org/10.1134/S1069351316010055>

Keywords

diffusion, homogenization of the exsolution structures, magnetite, size of the exsolution structures, thermomagnetic curves, ulvospinel